



GDOT Publications

Policies & Procedures

Form Word:4170-5f - Hydraulic Engineering Field Report

Section:Hydraulics

Office/Department: Office of Bridge Design

Reports To: [Reports To Department Name]

Contact: 404-631-1000

See [below](#)

HYDRAULIC ENGINEERING FIELD REPORT

I. HYDRAULIC AND HYDROLOGICAL DATA REQUIRED FOR ALL EXISTING OR PROPOSED BRIDGE STREAM CROSSING PROJECTS

A. Project Location

Project No.: _____ County: _____ District: _____

P.I. No.: _____ Stream Name: _____ Route: _____

Surveyed By: _____ Date: _____

B. Site Information

Floodplain and Stream Channel description:

1. Flat, rolling, mountainous, etc.: _____

2. Wooded, heavily vegetated, pasture, _____
swampy, etc.: _____

3. Stream channel description: well-defined banks, meandering, debris, etc.

4. Is there any fill in the upstream or downstream floodplain, which will affect the natural drainage or limit the floodplain width at this site?

C. Required Existing Bridge Information at Project Site

1. Bridge Identification No.: _____

2. Date Built: _____

3. Skew angle of bridge bents: _____

4. Height of curb, parapet or barrier: _____

Substructure Information:

1. Column type (concrete, steel, etc): _____

2. Size of columns: _____

3. Number of columns per bent: _____

4. Guide Bank (Spur Dike) length, elevation and location (if applicable):

5. Note any scour problems at intermediate bents or abutments:

Note: The above information is required for all bridges within the floodplain (main and overflow bridges) along the roadway. In addition, the location, size and number of barrels are required for all box culverts located within the floodplain.

D. Normal Water Surface Data

WS ELEV

500 feet upstream of survey centerline: _____

At the survey centerline: _____

500 feet downstream of survey centerline: _____

Normal high tide: _____

Normal low tide: _____

E. Historical Flood Data

1. Extreme high water elevation at site: _____ Date: _____

2. Highest observed tide elevation: _____ Date: _____

3. Location of extreme high water elevation (upstream/downstream face of bridge at the centerline or station and offset if not at bridge):

4. Source of high water information: _____

5. Location and floor elevation of any houses/buildings/structures that have been flooded:

6. Information about flood (number of times structure has been flooded, water surface elevations and date(s) of flood):

7. Location and floor elevation of any houses/buildings/structures that have floor elevations within 2 feet of the extreme high water elevation:

F. Benchmark Information

Location 1:

1. Benchmark Name: _____ Elevation: _____

2. Location (*project stations/offset*): _____

Northing: _____ Easting: _____

3. Physical description: _____

Location 2:

1. Benchmark Name: _____ Elevation: _____

2. Location (*project stations/offset*): _____

Northing: _____ Easting: _____

3. Physical description: _____

Location 3:

1. Benchmark Name: _____ Elevation: _____

2. Location (*project stations/offset*): _____

Northing: _____ Easting: _____

3. Physical description: _____

G. Upstream and Downstream Structures

Structure 1

1. Structure Type (railroad/highway bridge, culvert): _____
2. Route Number (if applicable): _____
3. Distance from proposed structure along stream centerline: _____
4. Length of bridge or culvert size: _____
5. Superstructure (slab thickness, beam depth): _____
6. Substructure information: _____
7. Column Type (concrete, steel, etc.): _____
8. Size of Column: _____
9. Number of Columns per bent: _____

Structure 2

1. Structure Type (railroad/highway bridge, culvert): _____
2. Route Number (if applicable): _____
3. Distance from proposed structure along stream centerline: _____
4. Length of bridge or culvert size: _____
5. Superstructure (slab thickness, beam depth): _____
6. Substructure information: _____
7. Column Type (concrete, steel, etc.): _____
8. Size of Column: _____
9. Number of Columns per bent: _____

Structure 3

1. Structure Type (railroad/highway bridge, culvert): _____
2. Route Number (if applicable): _____
3. Distance from proposed structure along stream centerline: _____
4. Length of bridge or culvert size: _____
5. Superstructure (slab thickness, beam depth): _____
6. Substructure information: _____
7. Column Type (concrete, steel, etc.): _____
8. Size of Column: _____
9. Number of Columns per bent: _____

NOTE: The above information is required for all bridges or culverts, which lie within 2000 feet upstream or downstream of the project bridge, unless otherwise directed by the Office of Bridge Hydraulics.

H. Miscellaneous Information

1. Are there water surfaces affected by other factors (high water from other streams, reservoirs, etc.):

2. Give location (horizontal distance to dam or spill way along stream centerline), length, width and elevation of dam and spillway, if applicable:

II. REQUIRED SURVEY INFORMATION REQUIRED FOR ALL EXISTING OR PROPOSED BRIDGE STREAM CROSSING PROJECTS

Note: It is preferred that the hydraulic survey data be taken in DTM format. The coverage shall be detailed enough to cover all required areas specified in this field report. These survey points should be included in the InRoads/CAiCE file that is provided to the bridge hydraulics office. All survey points should be labeled consistently and clearly identified. Sketches and/or plots can be used to clarify the survey data, but are not required. **ALL SURVEY DATA SHALL BE REFERENCED TO NAVD88.**

Topo coverage shall be taken at least 100 feet to the left and right of the centerline, except for the area 500 feet before the beginning of the existing bridge to 500 feet beyond the end of the bridge. The coverage in this area should be a minimum of 200 feet left and right of the centerline of the existing road and/or construction/survey centerline. This topo coverage shall extend to an elevation 2 feet above the flood of record elevation on each end of the floodplain. The above coverage limits shall apply to both the existing centerline and proposed centerline, if different.

The topo shall be detailed enough to accurately define the profile of the terrain beneath the bridge, to include endrolls, stream channel banks, streambed elevations, and any other breaks in the terrain.

Bridge deck and bottom of beam shots shall be included for all bridges within the floodplain. Invert elevations and locations shall be provided for all box culverts within the floodplain.

A. Benchmarks

Three benchmarks are required: one at the beginning of the survey, one at the bridge or stream site, and one at the end of the survey. Location referenced to the project stations, elevation, northing, easting and a complete physical description are required for each benchmark. Benchmarks shall be coded as 245(Caice) or SBNCHMK(Inroads).

B. Stream Traverses

A stream traverse extending 500 feet upstream and downstream of the proposed bridge site. Cross sections of the stream channel are required underneath the existing bridge and at the centerline of the proposed bridge site, if different. Cross sections of the stream channel are required at 50 feet and 100 feet upstream and downstream of the proposed bridge centerline. Additional cross sections are required at 100 foot intervals along this traverse. These cross sections should include top of stream bank, edge of water and streambed shots. A sufficient number of streambed shots shall be taken to insure an accurate stream channel cross section. Traverses and stream cross sections shall be provided for all stream channels in the floodplain. As stated above, the DTM method is preferred, as long as it is detailed enough to accurately define the location and cross section profile of the stream channel 500 feet upstream and downstream of the proposed bridge site.

C. Floodplain Survey Data

Note: The required floodplain coverage shall be extended on both sides of the stream channel until an elevation is reached that is a minimum of 2.0 feet above the Flood of Record Elevation. The top of stream banks and channel cross section shall be included. A sufficient number of streambed shots shall be taken to insure an accurate

stream channel cross section. The floodplain coverage shall include shots where there is a significant change in elevation.

1. Floodplain cross coverage shall be taken at least 100 feet to the left and right of the centerline, except for the area 500 feet before the beginning of the existing bridge to 500 feet beyond the end of the bridge. The coverage in this area should be a minimum of 200 feet left and right of the centerline of the existing road and/or construction/survey centerline. This coverage shall extend to an elevation 2 feet above the flood of record elevation on each end of the floodplain. The coverage limits shall apply to both the existing centerline and proposed centerline, if different. **This data is also required for bridge and roadway sites located along the stream that are no further than 2000 feet upstream and/or downstream of the project site.**
2. Parallel bridge projects and/or projects with the proposed alignment shifted a relatively small distance require a floodplain coverage be taken along the new and/or parallel alignment.
3. New location projects require that a floodplain cross section be taken along the new alignment.

D. Existing Roadway Data

Note: This data is also required for roadway and railroad embankments located along the stream and within the floodplain that are no further than 2000 feet upstream and/or downstream of the project site.

1. A profile along the existing roadway extending the full width of the floodplain. This profile shall include shots along the centerline and top outside edges of the roadway embankment. For roads built on a constant cross slope, only the top outside edge of roadway shots are required.
2. Profiles are required of all intersecting roads that are located within the limits of the floodplain. These profiles shall extend 500 feet upstream and/or downstream of the intersection with the project road.
3. Shots along the toe of roadway embankment are required within the limits of the floodplain.

E. Existing Bridge Data

Note: This data shall be provided for all bridges located within the floodplain. Culvert location, invert elevations, and the size and number of barrels shall be provided for all culverts located within the floodplain.

This data is also required for bridges located along the stream and within the floodplain that are no further than 2000 feet upstream and/or downstream of the project site.

For bridge widening projects where the existing bridge plans are not available, a more detailed survey that gives a complete description of the superstructure and substructure will be required.

1. For bridge replacement and paralleling projects, top of deck shots at the beginning and end of bridge at the intersection of the Back Face Paving Rest (BFPR) with the centerline and

gutterlines are required. If the bridge is built on a constant cross slope/superelevation, only the gutterline shots are required.

2. For bridge widening projects, in addition to the begin and end of bridge deck shots, top of deck shots are also required at the centerline of bents and at midspans along the centerline of the bridge and gutterlines. If the bridge is built on a constant cross slope/superelevation, only the gutterline shots are required.
3. Bottom of beam shots for the outside beams at each bent are required.
4. A profile of the groundline and endrolls under the bridge. Shots along the toe of endrolls are required. A stream cross section shall be included. All points shall be clearly labeled.

F. Normal Water Surface Data

1. Water surface elevations are required at the survey centerline, and at 500 feet upstream and downstream of the survey centerline. These shots shall be taken in the same time period.
2. For tidal sites the normal high and low tide elevations are required.

G. Historical Flood Data

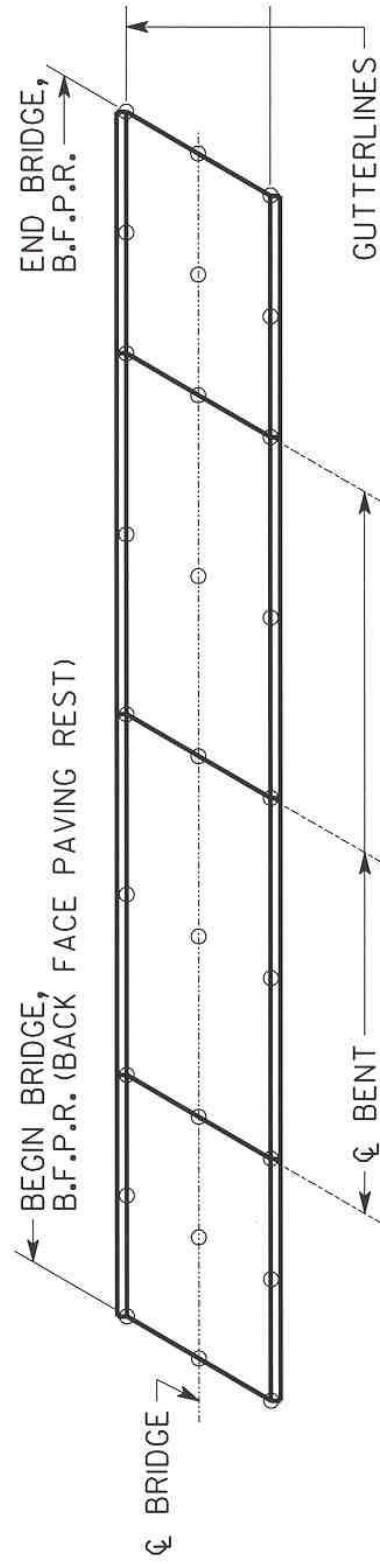
Note: The highwater elevations should be obtained from longtime local residents and/or city/county officials.

1. The extreme highwater elevation (flood of record) shall be obtained along with the date of occurrence, location (upstream or downstream face of the bridge at the centerline or station and offset if not at bridge), and the source for this information. If the site is tidal, then the highest observed tide elevation is needed.
2. The floor elevations and locations of any houses, buildings or any other structures that have been flooded, or have floor elevations within 2 feet of the flood of record. For buildings/structures that have been flooded, the information about the flood shall be provided. This information includes the number of times the structure has been flooded, the date(s), and the highwater elevations.

H. Miscellaneous Survey Data

1. **Dams and Spillways.** For sites affected by an upstream or downstream dam, survey shots are required that describe the location, length, width and elevation of the dam embankment and spillway opening. If possible, provide distance along stream centerline to dam. The water surface elevation of the impounded water shall be provided.
2. **Guide Banks (Spur Dikes).** Shots shall be taken that will reflect the location, length and elevation of the guide bank.
3. **Longitudinal Roadway Encroachments on Floodplains.** Additional floodplain cross sections will be required to determine the effects of the longitudinal encroachment. **The surveyor can contact the Office of Bridge Hydraulics for guidance on the extent of additional survey data that will be required.**
4. If the hydraulics at the project site is affected by other factors such as confluence with other streams, narrow floodplain cross sections, and/or roadway, railroad, bridge crossings, etc., additional floodplain cross sections may be required. The surveyor should contact the Office of Bridge Hydraulics if any of the above-mentioned conditions are present at the site, in order for the hydraulic engineer to determine whether additional information is required.

- PROVIDE DECK ELEVATIONS AT BFPR, & BENTS AND AT MIDSPAN ALONG THE & BRIDGE AND GUTTERLINES. SEE SECTION II.E OF THE HYDRAULIC ENGINEERING FIELD REPORT.

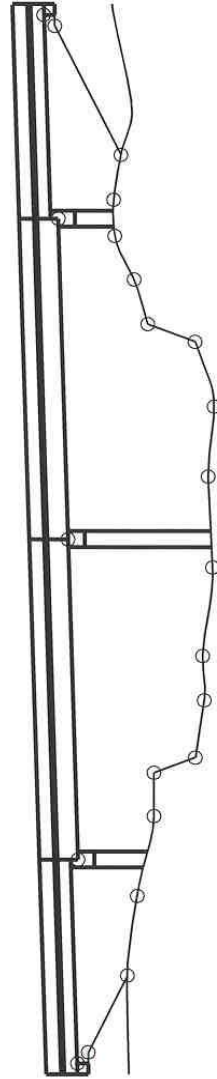


REQUIRED BRIDGE DECK ELEVATIONS

FIGURE I

- REQUIRED BRIDGE OPENING SHOTS. SEE SECTION II.E OF THE HYDRAULIC ENGINEERING FIELD REPORT.

A SUFFICIENT NUMBER OF STREAMBED SHOTS SHALL BE TAKEN TO INSURE AN ACCURATE STREAM CHANNEL CROSS SECTION.



TYPICAL SECTION - PROFILE OF BRIDGE OPENING

FIGURE 2

References:

None.

History:

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